Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE

General Certificate of Secondary Education

CYD-BWYLLGOR ADDYSG CYMRU

Tystysgrif Gyffredinol Addysg Uwchradd

141/04

DESIGN AND TECHNOLOGY

PAPER 2

FOCUS AREA: RESISTANT MATERIALS TECHNOLOGY

(Higher Tier – Grades D to A*)

P.M. TUESDAY, 6 June 2006

(1½ hours)

	Leave Blank
Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
TOTAL MARK	

ADDITIONAL MATERIALS

You will need basic drawing equipment and coloured pencils for this examination.

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answer, continue the answer at the back of the book, taking care to number the continuation correctly.

INFORMATION FOR CANDIDATES

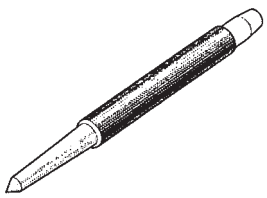
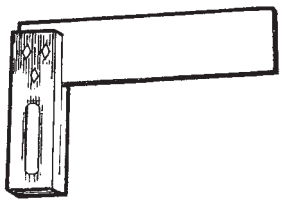
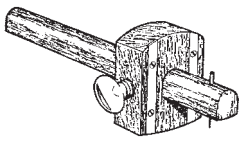
The number of marks is given in brackets at the end of each question or part-question.

No certificate will be awarded to a candidate detected in any unfair practice during the examination.

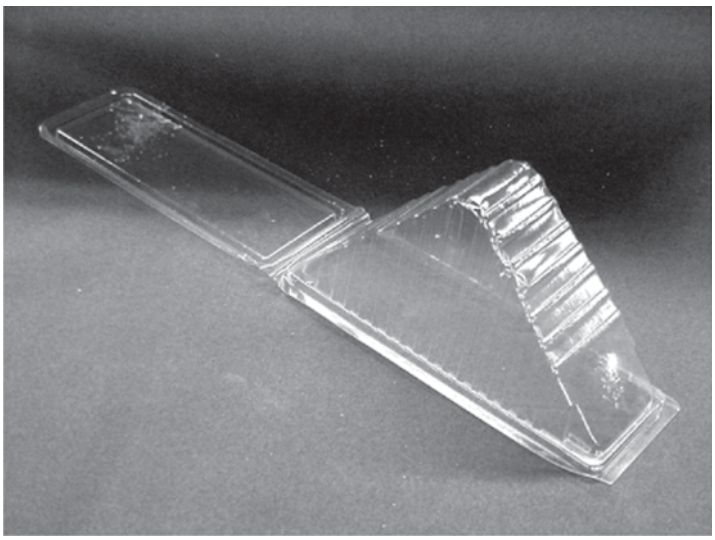
Answer **all** *questions in the spaces provided*.

1. *(a)* From the list below, select the correct name for **each** marking out tool shown and state what each is used for. [8]

Marking Gauge **Tri Square** **Centre Punch** **Scriber**

Marking out tool	Name	Use
	.....	....
	.....	....
	.....	....
	.....	....

(b) A disposable plastic sandwich container is shown below.



(i) Name the process used to manufacture the sandwich container. [1]

.....

(ii) Name a suitable plastic material for the sandwich container. [1]

.....

(iii) Give **two** reasons why the material you named in part (ii) is suitable for the sandwich container.

Reason 1: .....

..... [1]

Reason 2: .....

..... [1]

(iv) Describe **two** important considerations that the designer would need to think about when designing this sandwich container. 2 × [2]

Consideration 1: .....

.....

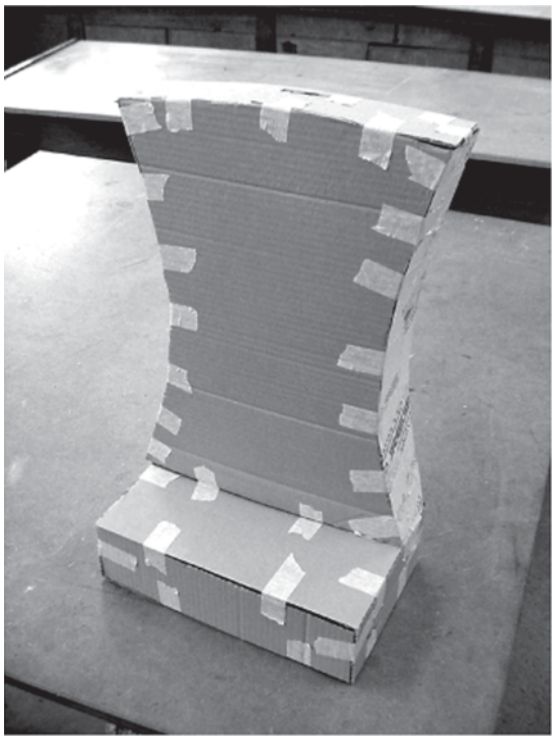
.....

Consideration 2: .....

.....

.....

2. The photograph below shows a model that has been made out of card.



(a) Give **two** advantages to the designer for making a card prototype when developing a design. 2 × [2]

Advantage 1: .....

.....

Advantage 2: .....

.....

(b) (i) Wood needs to be seasoned. Name the **two** methods of seasoning wood. [2]

Method 1: .....

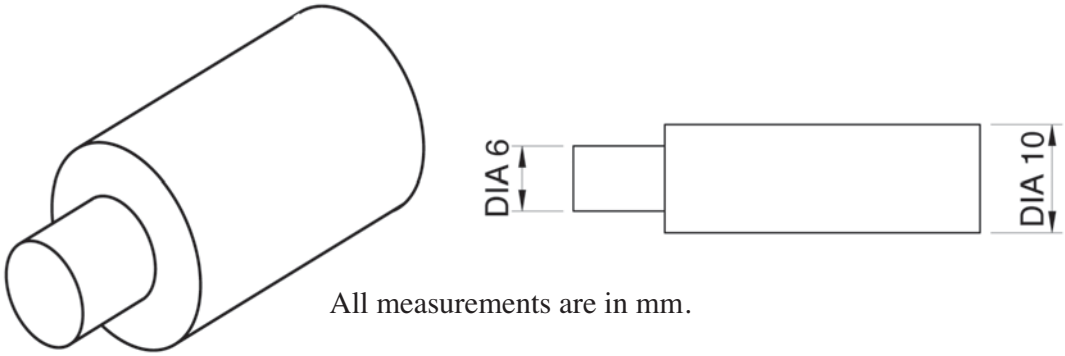
Method 2: .....

(ii) Give **two** reasons why it is necessary to season wood. 2 × [1]

Reason 1: .....

Reason 2: .....

(c) The diagram shows part of an axle for a child's bike. It is manufactured from a single piece of 10mm mild steel bar.



All measurements are in mm.

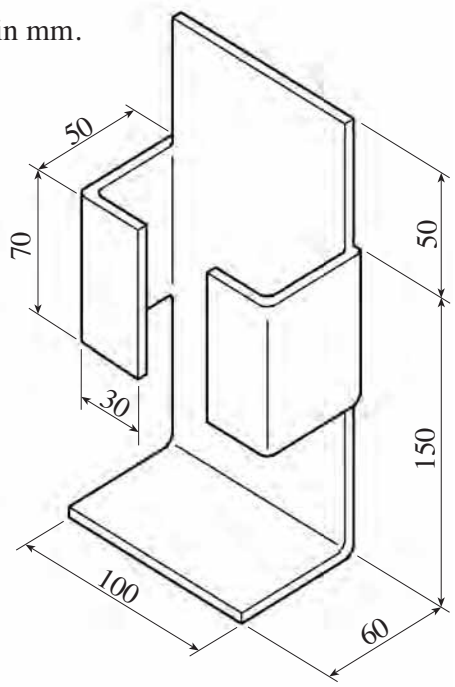
Use notes and/or sketches to explain how you would:

(i) reduce the diameter of the end of the bar to 6mm; [4]

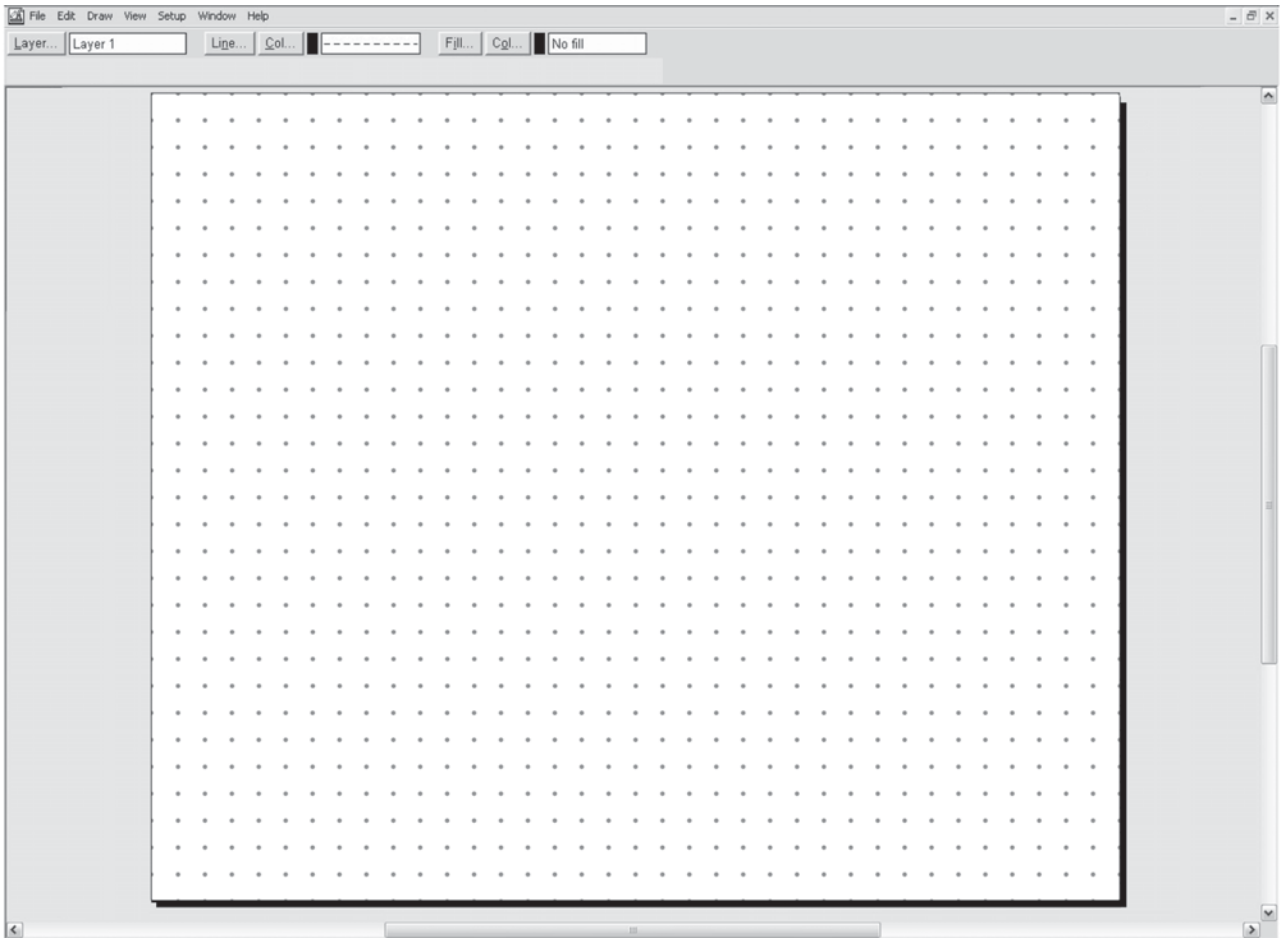
(ii) produce a thread on the end of the bar to attach a metal nut. [4]

3. A design for a wall mounted holder for an electric razor is shown below. The holder is designed and made using CAD and CAM (computer aided design and computer aided manufacture).

All dimensions are shown in mm.



(a) The holder is designed on CAD as a one piece development (net). Draw the net required on the grid below. The dots are spaced 10mm apart. [5]



(b) Give **two** advantages of using CAD to design the product.

Advantage 1: .....

..... [1]

Advantage 2: .....

..... [1]

(c) The holder is manufactured from 3mm thick plastic material using a CAM machine.

(i) Name a suitable plastic material for making the holder and give a reason for your choice.

Plastic: ..... [1]

Reason: .....

..... [1]

(ii) Name a specific suitable CAM machine for making the holder. [1]

.....

(d) Use notes and sketches to show how you would accurately bend the plastic into the correct shape. [4]

(e) Give **two** considerations that would need to be taken into account if a batch of 30 of the holders were to be manufactured in a cost effective way. 2 × [2]

Consideration 1: .....

.....

Consideration 2: .....

.....

(f) (i) Explain in detail the difference between a **Thermoplastic** and a **Thermosetting** plastic. [3]

.....

.....

.....

.....

(ii) Place the following processes into the table to indicate whether they are suitable for use with Thermoplastic or Thermosetting plastic. [4]

Plastic extrusion **Compression moulding** **Blow moulding** **Injection moulding**

Thermoplastic	**Thermosetting plastic**

THERE ARE NO QUESTIONS ON THIS PAGE

TURN OVER FOR QUESTION 4

4. The picture shows a hardwood garden bench together with a close up detail of a leg and cross rail (Diagram **A**).

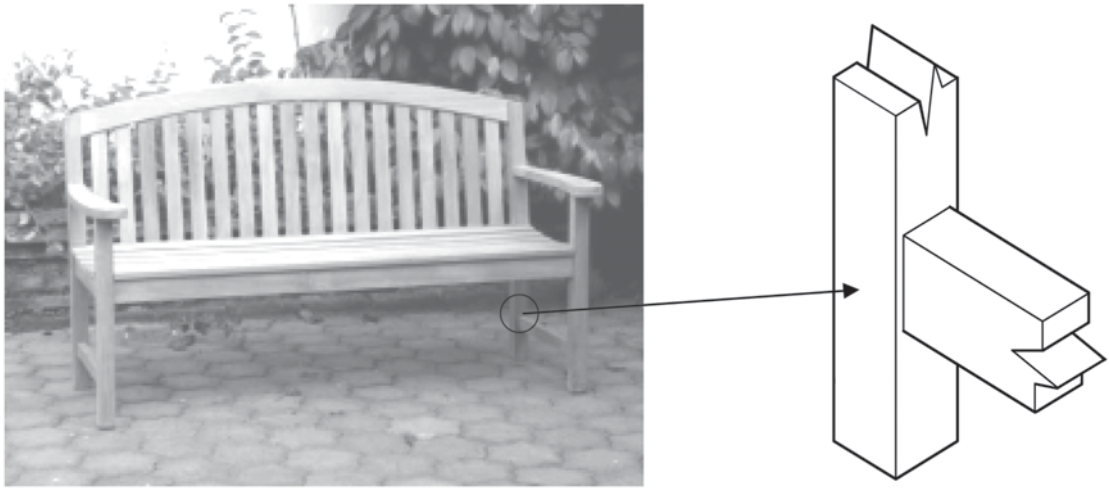


Diagram **A**

(a) The bench is made from teak. Other than being strong, describe **two** reasons for using teak. 2 × [2]

Reason 1: .....

.....

Reason 2: .....

.....

(b) In the space below, name and sketch a suitable permanent joint to join the leg and cross rail (Diagram **A**). [5]

Name of permanent joint : .....

(c) Many garden centres and DIY outlets sell garden benches 'flat packed'. Give **three** reasons why such products are often much cheaper to buy than pre-assembled products.

3 × [2]

Reason 1: .....

.....

Reason 2: .....

.....

Reason 3: .....

.....

(d) Increasingly, manufacturers will use wood from 'managed forests'. Explain what you understand by the term 'managed forests'. [3]

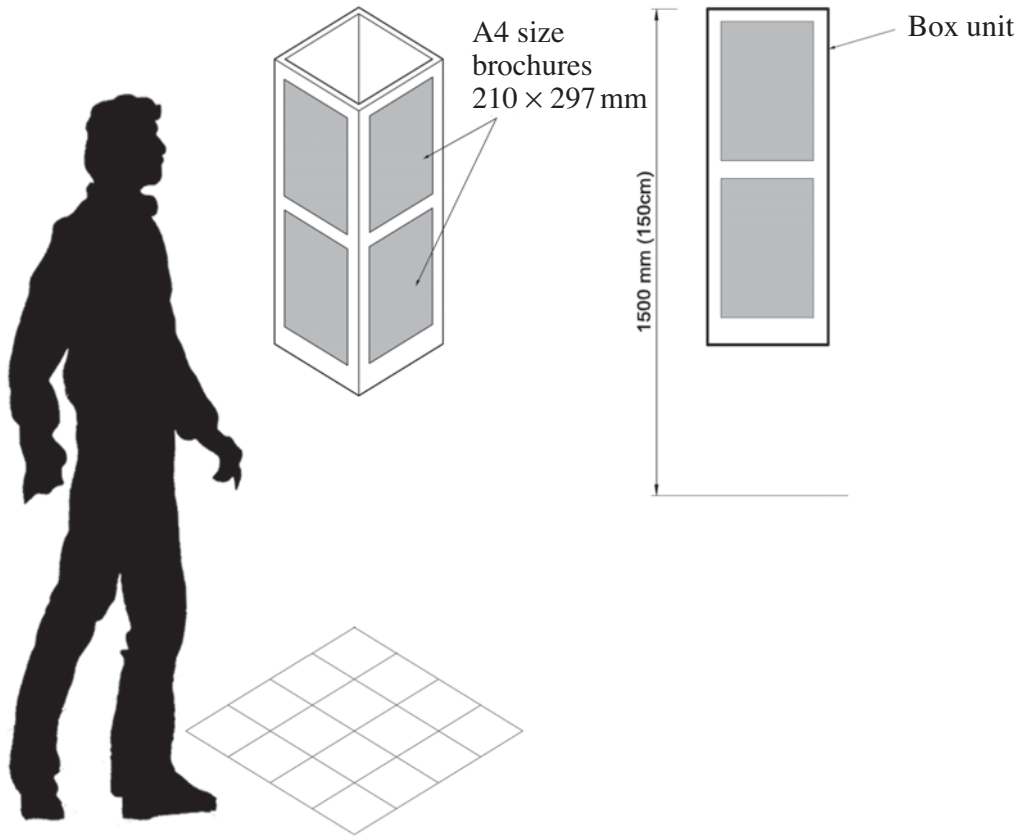
.....

.....

.....

5. The diagram shows a basic design for a rotating box unit to display A4 size school brochures in the reception area in a secondary school. The design is to comprise of a box unit supported at an appropriate height by a stand.

You have been asked to complete the design.



Specification

The unit must:

- be freestanding;
- be able to rotate through 360 degrees;
- allow visitors to easily remove the A4 brochures.

(a) Sketch your solution on the opposite page.

Marks will be awarded for:

(i)	showing clear details of the size and construction of the box unit;	[4]
(ii)	showing clear details of how the supporting stand is constructed;	[5]
(iii)	showing clear details of how the design will be able to rotate through 360 degrees;	[5]
(iv)	materials and fastenings used;	[2]
(v)	quality of communication.	[4]

Turn over for part *(b)*

(b) In the space below show a means of holding and displaying the A4 size brochures in position on the box unit. (The brochures will be the same size and thickness as this exam paper.) [5]

For continuation only.